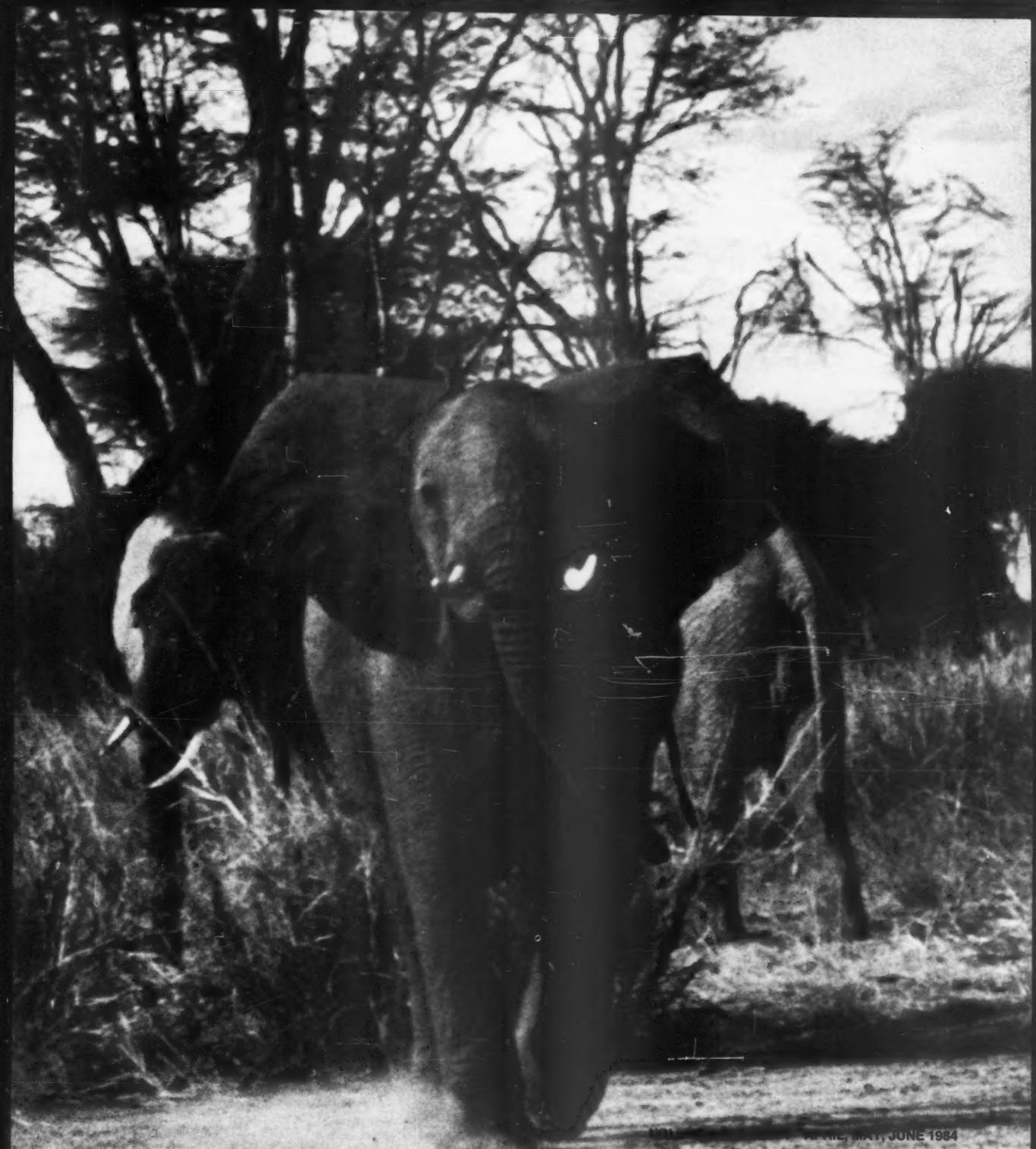

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PARKS

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RICHARD A. MEGANCK and BAL S. RAMDIAL — 1 — Trinidad and Tobago Cultural Parks: An Idea Whose Time has Come

CHAO CHING JU — 6 — The Changpai Mountains Nature Reserve

FELICIA C. COLEMAN and D.H.S. WEHLE — 9 — Plastic Pollution: A Worldwide Oceanic Problem

J.H. GROBLER — 13 — Management Planning: The Natal Parks Board Approach

FRANCESCO FRAMARIN — 16 — PARK VIEWPOINTS

18 — PARK TECHNIQUES

18 — Energy Efficient Park Office

21 — Something for the Very Young

21 — Interpretation Opportunities

21 — Simple Clamps for Many Applications

21 — A Firm Temporary Connection

22 — CNPPA NOTES

24 — BOOKS & NOTICES

Front cover: One of the major objectives of the Natal Parks Board of South Africa is the conservation of an optimum number of indigenous species, such as this elephant, and their habitats. The natural ecological processes of the natural areas should be permitted to operate without interference except under imperative circumstances. Photo: Fred Packard

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Richard A. Meganck and
Bal S. Ramdial

Trinidad and Tobago Cultural Parks: An Idea Whose Time Has Come

That society demands a variety of outdoor recreation/education experiences is no longer questioned. On a national level the goal of recreation planning and management is, therefore, the provision of a diverse range of opportunities to meet these demands.

Culture, among other factors, undoubtedly influences recreation preferences and should also be reflected in management actions. Often this is not the case because North American or Western European planning-management models have been superimposed on distinct cultural settings, with mixed results. This is not a criticism of the models per se but an unfortunate trend in many small third world nations where the cultural heritage is not preserved by incorporation at the time of park planning, development and management. This situation is further aggravated by the unavailability of personnel with specialized training to ensure input of the right information at the right time. Evolutionary patterns are reflected in culture, and management must also be, to a large degree, indigenous. There is no better place for this to occur than in the development of cultural parks.

The nation of Trinidad and Tobago, having only gained independence in 1962, provides a microcosm of the development process. In forging its own destiny there is a conscious effort to realize the potential of its uniqueness. The country is developing at a geometric rate largely influenced by the windfall revenue from the petroleum sector in the mid 1970s. During this period progress, as measured in traditional terms, has been notable. Gross national product per capita, expendable income and available leisure time have increased many times. No longer the prototypical sleepy Caribbean island, it has progressed rapidly from an agriculture-based economy to an industrialized nation and is foremost in the Caribbean region in financing a variety of development projects.

These factors have, of course, affected some sectors negatively. Most notable has been the tremendous increase in demands from all segments of society placed on the natural resource base. One of the greatest impacts is overuse of existing outdoor recreation facilities in forests and parks throughout the country, where most of the facilities had been constructed when both the demand and the population were small. Natural areas are being converted rapidly to other uses, such as extractive industries, and habitat loss has resulted in reduced numbers of plant and animal species as well as culturally significant areas.

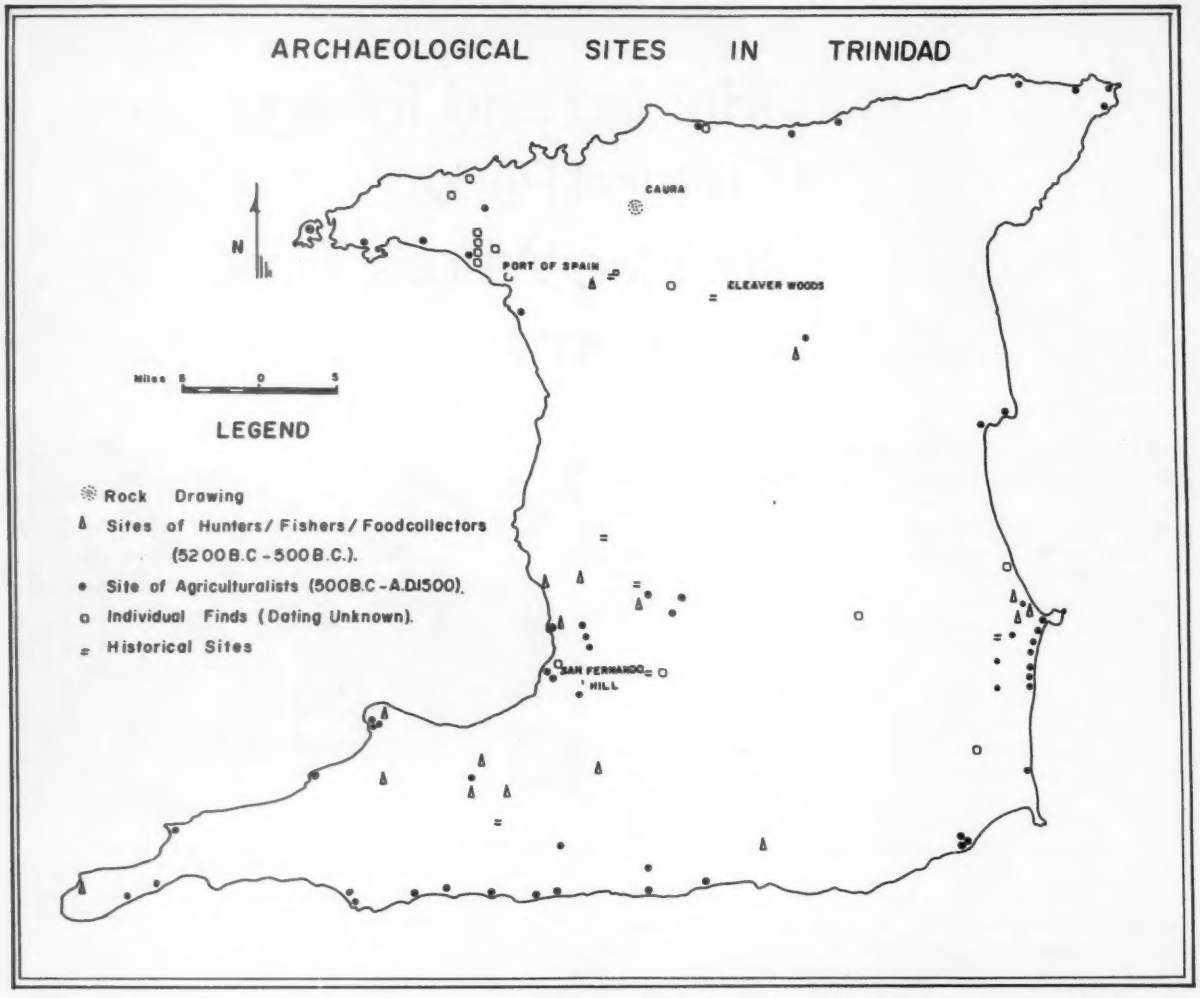
In this rush to be modern, to forget and distance oneself from the past, agriculture production has declined in a near linear fashion compared with the growth in the industrial sector; and "imported" is regarded as somehow being inherently superior. While many tend to disregard their precolonial and colonial past, it is the foundation without which any people lose a sense of progress in relative terms. This is particularly the case in cultural history. Technology and science may now be international, but history, folklore, dance, music, art and the like are indigenous—at least in a regional sense if not on a national scale.

Cleaver Woods Recreation Park Visitor center, built of bamboo and wattle, is a replica of a mid-1800s Amerindian dwelling. It interprets culture of several tribes of native Indians and is heavily used by school groups and other visitors.

Abbreviated History of Trinidad and Tobago

When the islands of Trinidad and Tobago were first sighted by Europeans in 1498, they were inhabited by two primary groups of Amerindians, Arawaks and Caribs, who migrated from the South American mainland over a period of several thousand years. They lived a sedentary, agriculture-based lifestyle. When the Spaniards settled in the early 1600s many of the natives fled to the mainland. This trend, combined with the sale of natives as slaves to other islands and the effects of European diseases such as small pox and measles, led to a drastic reduction in the numbers from 40,000 at the time of discovery to fewer than 4,000 by the mid 17th century (Boomert, 1982). To supplement their numbers, estate owners imported slaves of African descent to work the sugar, cocoa and citrus plantations in the 18th century.

With the takeover by the British in 1797 and the subsequent abolition of slavery in the 1830s, plantation owners imported indentured laborers from India to meet a labor shortfall. After their period of indentureship they were invited to remain, pur-



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chase land and continue cultivating a variety of crops for export to Europe.

Many battles were waged in the waters surrounding these islands between the governments of France, Portugal, Holland, Spain and England in addition to frequent encounters with pirates and commissioned buccaneers. Today therefore, the young nation of Trinidad and Tobago has a rich cultural heritage—the result of each group bringing its music, crafts, folklore and language.

Cultural—Historical Parks in Trinidad and Tobago

Traditionally, funds for restoration, preservation and historical interpretation in the country have been limited. What has been accomplished during the post-independence era was spearheaded by the Trinidad and Tobago Tourist Board, which develops and manages tourist facilities, including historic homes, forts, archaelogical sites and beaches. Many other organizations assist in the needed research and interpretation of these areas, including the University of the West Indies, the National Cultural Council, the local chapter of ICOMOS (International Council on Monuments and Sites), the Trinidad and Tobago Historical Society, UNESCO, the Trinidad Field Naturalist Club and many individual citizens. In addition, the National Parks Section of the Forestry Division, in cooperation with the Department of Regional Development of the Organization of American States, in recent years has initiated efforts aimed at complementing ongoing activities. We would like to highlight briefly examples of how the Division, through its park system, is interpreting the past, providing an opportunity for the continuation of important cultural traditions and entertaining innovative ideas to generate further interest in its local folklore.

Cleaver Woods Recreation Park— An Amerindian Visitor Center

National parks and protected areas offer exceptional opportunities to interpret not only the events or customs of the past but also relationships of man to the land. The Amerindians from the northern portion of Trinidad were involved in agriculture as far back as their activities can be traced; first shifting (slash/burn) cultivators and later practicing cultivation around established villages.

The area surrounding Cleaver Woods Recreation Park was a center for Amerindian activity from the mid 1600s after the establishment of Roman Catholic Capuchin missions in Tacarigua,

Arouca, Caura and Arima. From large numbers only 507 Amerindians survived by the mid 1800s (Boomert, 1982). Their past impact on the present day Trinidadian society is noteworthy and the National Parks Section felt that the 13 ha-site at Cleaver Woods provided an outstanding opportunity to interpret this aspect of culture as recorded by archaeological finds, recent history and the recollections of living descendents of the Island's first inhabitatants.

Cleaver Woods was designated a priority area for development under the Trinidad and Tobago—OAS/DRD project on the "Establishment and Management of a National Park System" and preliminary work was initiated in 1980. In March, 1982, the park opened. Facilities include picnic sites, a small children's playground, nature trails, parking area, rest rooms and a visitor-interpretation center constructed in the style of an Amerindian house—an ajoupa.

The visitor center features wattle-and-daub walls made with roseau *(Bactris major),* a timite thatched roof *(Manicaria saccifera),* bamboo and manac palm *(Euterpe oleracae)* infrastructure and a mud floor "polished" with a dung surface. The design and materials used in the construction of the center produce a naturally cool environment within which surprises visitors accustomed to air conditioning. Displays include archaeological finds, maps tracing the history of Amerindian settlement in Trinidad, modern handicrafts employing old methods and replicas of implements fashioned from forest products which were used in the daily lives of the natives. Many of the trees which were important to the Amerindians exist or are being introduced in the park to provide visitors with a rich learning experience.

That Trinidad owes much to its Amerindian past has been well documented. Some 200 archaeological sites have been identified but only a few have been excavated. Many names of villages, rivers, bays, etc. have their origins in one of the Amerindian dialects and several important foot paths and trails have influenced the location of modern day cities and roads (Boomert, 1982).

The Cleaver Woods ajoupa is a tribute to the past of this nation and helps maintain a sense of the society's roots. Much more needs to be done, but the Forestry Division considers this an admirable first attempt based on feedback from the general public.

Caura Riverine Park—Living Culture through Religious Ceremonies

Mountain tops, rivers, caves and ocean beaches are all natural settings considered to be sacred and conducive to spiritual pursuits by the Hindu community. Traditionally, such places provide a peaceful and invigorating environment both in a spiritual and physical sense. Hindus in Trinidad and Tobago, having brought their culture with them at the time of indentureship, utilize the banks of the rivers for their religious pursuits. The Tacarigua River which flows through Caura Riverine Park is one such river which has been used for many years for religious ceremonies.[1]

Generally the ceremonies can be classified as (1) those dealing with devotion to celestial dieties *(Dev Poojan),* (2) those which revolve around either the death of a family member *(Dash gatr)* or one's ancestors *(Pitri Paksh)* and (3) an annual cleansing bath *(Kartik Nahan).*[2] The *Dash gatr* is performed with regularity in Caura Park as fresh running water is essential.

1. In addition to the Hindu ceremonies described in this paper, Spiritual Baptists use the Tacarigua River for the baptism ceremony.

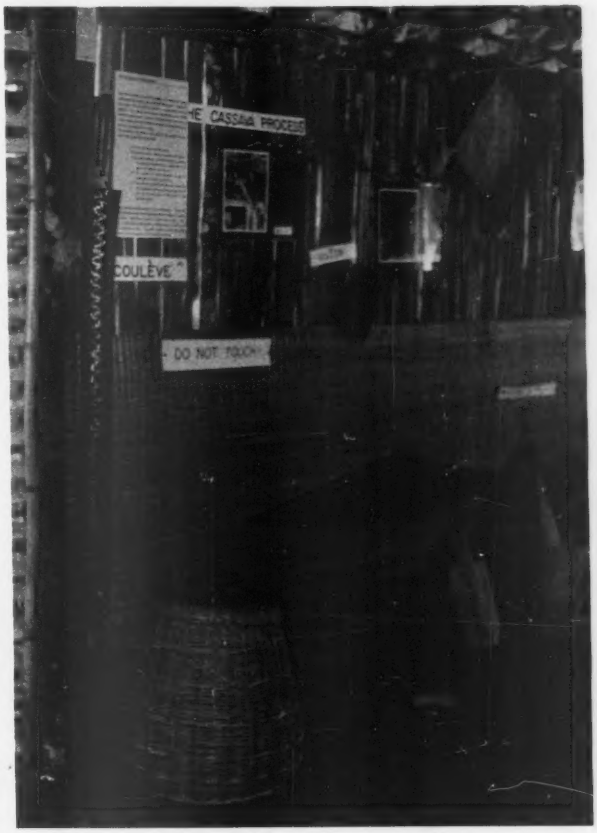
2. Occurring in October and November.

The *(Pitri Paksh)* or ancestral worship ceremony is performed every year during the Hindu month of *Kuar* (dark fortnight) which falls between September and October. The *Dash gatr* or shaving ceremony is performed on the tenth day following cremation of the dead.[3] In this purification ceremony, normally the head, beard and moustache of the eldest son of the deceased is shaved after which he bathes, chants, reads from the scriptures and, on behalf of the departed soul, offers the dieties food specially prepared and blessed by the family priest by placing it in the river current.[4]

In addition to *Dev Poojan* prayers, full moon bathing, meditation and yoga are often conducted in or near fresh running water. Traditionally, the area designated for religious activities was situated in the uppermost portion of the river where it flows through the park. In the absence of any developmental planning and management, these ceremonies conflicted with traditional outdoor recreation pursuits. For convenience the shaving portion was often performed in the water and floating hair contaminated

3. Cremation takes place in sites specifically designated by the government (Caroni River bank, Mosquito Creek).

4. Personal communication, Dr. S. Parasram, Cardi, UWI, St. Augustine, Trinidad and Tobago.



Cleaver Woods Visitor Center display contains artifacts of drinking, eating, fishing, agriculture methods, etc. Shown is a food storage basket made from woven strips of native tree root. Filled baskets would be surrounded by sawdust for insulation and protection. Hanging on the wall above the basket is a cassava press, used to remove toxic juices from cassava fruit before use as a food staple.

the water downstream for washing of meat, outdoor cooking, swimming and for the nearby villagers who drink untreated river water. On the other hand, when religious activities were confined to an area immediately downstream to that designated for picnicking, Hindus complained that the ceremonial environment was contaminated by the washing of meat in the river and the consumption of alcohol in close proximity — both expressly prohibited during sacred activities.

During a recent OAS/Forestry Division planning exercise, it was decided to extend the park downstream and accommodate religious activities in a secluded area with a separate entrance, water, rest room and changing facilities. Additionally, religious leaders were requested to conduct the shaving on the river bank and deposit the hair into bins. Complementing these measures, the slaughter of any animal will be prohibited and the washing and preparation of meat will be restricted to an area away from the river with basins, treated water, cutting boards and garbage bins. In this way these activities will be regulated and separated so that both can continue without further conflict or adverse affect on the nearby village (Meganck, et. al., 1983).

While providing facilities specifically for traditional religious ceremonies within public parks may not be the international norm, it is considered an acceptable adaptation to the local setting. It promotes cultural understanding, is a political reality in a diverse society, meets a stated local demand and also helps build grass-roots support for the continued expansion of a system of protected areas.

San Fernando Hill—An Opportunity Nearly Lost

The 15 ha comprising Naparima Hill, often referred to as San Fernando Hill, is situated completely within the Borough of San Fernando in southern Trinidad. It rises from just above sea level to a height of 180 m and is the most prominent landscape feature for miles around. Once it was a steep-sided hill nearly 300 m high with a rounded top having a sugar-loaf appearance similar to the famous landmark of Rio de Janeiro. However, most of the surface has been removed, the result of quarrying activities initiated over 100 years ago. Only the southwest portion retains its natural shape while the remainder of the hill consists of a series of plateaus surrounded by steep squared cliffs. Near the top, three pinnacles have been left unquarried and these are clearly visible from a considerable distance.

This mistreatment notwithstanding, the hill is still important. Archaeologists maintain that it was a sacred place from as early as 3000 BC. Actual archaeological finds on the site have been recovered but they are few in number, have been recent and date between 300-700 AD. The design features of these pieces, however, show a strong spiritual awareness, which supports the concept of the hill's sacredness.

In addition, there are still some 3 ha of undisturbed land which merit investigation, and historic buildings on the site which deserve restoration and interpretation. To this end, several groups have studied various aspects of the hill since quarrying was halted in 1977. Had this activity continued, all future benefits undoubtedly would have been lost. In 1980, the area was designated a potential National Natural Landmark in the National Park System Plan and in 1983 a Forestry Division team was charged with reviewing all existing documentation and making recommendations for the areas's future management. With the completion and implementation of a management plan for the hill, an important landmark of Trinidad's cultural past will be preserved for future generations.

Mythological Park—Forest Folklore

Folklore and mythology, associated with the forest environment and supernatural, abound in the territory. They make suitable themes for poets, painters and playwrights and provide ideas for carnival band leaders and village performances. The mythological figures form part of the local dialect and are occasionally used to describe characters in the community.

Rural folk and hunters rationalize that because there are good and bad people living among us so too in the mysterious world of the supernatural there are also good and evil spirits. They claim that the spirits cannot be seen with the naked eye and support their beliefs by referring to the wind as an example which cannot be seen but is known to exist.

The folklores are fascinating and there are different versions to each one depending on the environment in which they are related and the narrator's flair for establishing the scenario and flavoring them with his own experiences and mannerisms. Some persons are capable of keeping their audiences spellbound in the best of urban environments.

The folklores and mythological figures have played an important role in the conservation of several trees and sites by instilling a certain type of reverence in the form of rituals by those who came in close contact with them.

The Forestry Division has been stimulated to explore the possibility of planning and developing a mythological park in the near future. Folklore literature is available and further research to give authenticity to the entire concept will be essential. Initially, it will involve the selection of a representative forest scene with suggestions from woodcutters, hunters and rural people to benefit from their experiences. The eerie sounds and apparitions associated with the mythological figures should be recreated. Once crystallized, this will add diversity to the system of parks and protected areas, broaden the base for a wider range of recreational and educational opportunities and add a new dimension to the park system that would enhance the flow of welcome foreign exchange.

Conclusion

The Government of Trinidad and Tobago, through the Forestry Division, has recently embarked on the establishment and development of a national park system which will contribute to a greater understanding of man's relationship to man in a cultural sense as well as stimulating a better appreciation of man's relationship to his natural environment. Viewed from another angle the parks system is expected to enhance international tourism by providing not only sun, sand and sea, but also the chance to enjoy the natural areas and rich cultural history of the region.

Lastly, a properly developed park may also help stem the flow of foreign exchange out of the country for overseas vacations. This is important in light of the drop in revenue from the petroleum sector. The potential is obvious and the Forestry Division, with the continued help and foresight by Government, intends to seize the opportunity and continue with these pioneering efforts.

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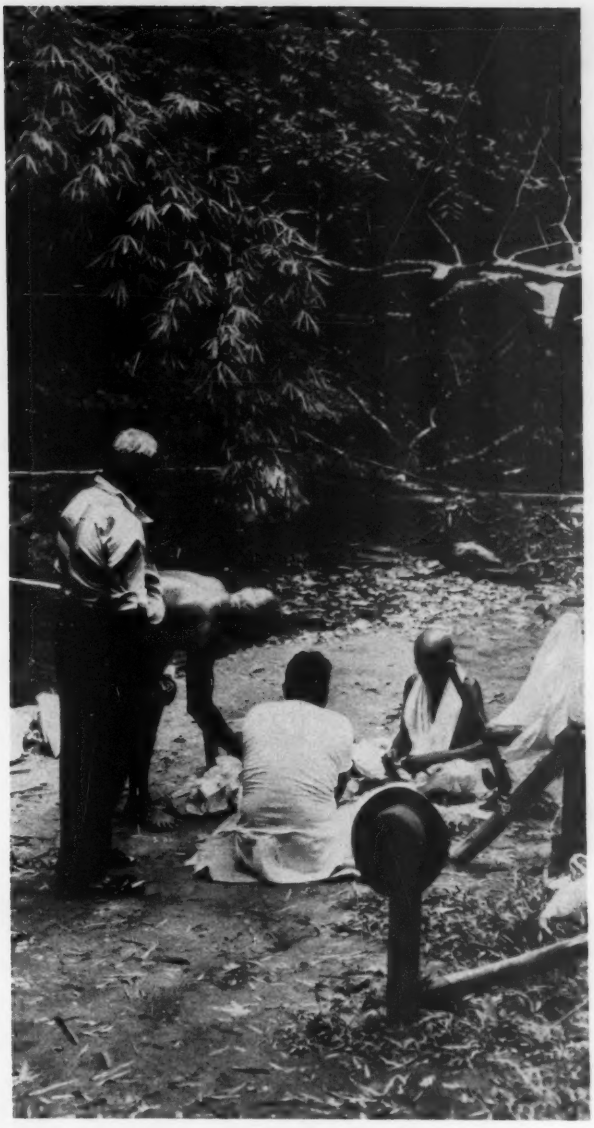

The Hindu shaving ceremony shown above is a purification ritual in which the head, beard and mustache of the oldest son of the deceased is shaved, after which specially prepared and blessed food is offered to the dieties by placing it in the river current.

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Dr. Ramdial is Conservator of Forests and Chief Game Warden, Forestry Division, Ministry of Agriculture, Trinidad and Tobago. Dr. Meganck was formerly Chief of the Forestry Division/OAS Dept. of Regional Development Project to establish a system of national parks and protected areas in Trinidad and Tobago. He is presently a Natural Resource Specialist for the Caribbean OAS/DRD.

Photographs by Richard Meganck

Chao Ching Ju

The Changpai Mountains Nature Reserve

All the protected areas in the People's Republic of China are called nature reserves, some of which are like nationat parks. One such is the Changpai Mountains Nature Reserve, at present the largest, most famous, and best administered in the country. Its majestic and beautiful mountains and abundant natural resources attract more and more Chinese as well as foreign visitors, especially ecologist, foresters, and nature conservators. The reserve is located in Kirin Province, in Northeast China, and covers 210,000 ha (518,910 ac). Of these, 130,000 ha (312,230 ac) are set aside as absolute reserve and 80,000 (197,680 ac) as ordinary reserve according to their natural ecological value. The management objectives are conservation of natural resources, scientific research, rational utilization of resources, and provision of cultural and recreational opportunities for the people.

Signs and a large photograph mark the entrance at Changpai Mountains Nature Reserve, providing visitor information on the many natural resources in the area. Photo: Prof. Duncan Poore.

The region has a very long history, beginning about 12 million years ago, when the mountains rose because of faulting. After 3 periods of volcanic activity about 2 or 3 million years ago, the Changpai Mountains again became active in the 16th century. The last volcano erupted 230 years ago, although several small earthquakes took place recently, indicating that the volcanoes may only be dormant.

Since the founding of the People's Republic of China in 1949, the government has paid great attention to conservation, management, development, and construction in the area. Highways and railways have been built and forestry enterprises established. Scientists have conducted a great number of investigations and studies and have prepared numerous reports. Alpine weather stations were set up in 1958, and in 1960 the People's Government of Kirin Province established the Changpai Mountains Nature Reserve as well as the Administrative Bureau. Various kinds of conservation work has taken place since.

The natural scenery in the reserve is magnificent. Because the mountains are snow-capped year round they are called Changpai, meaning "ever white." Heavenly Lake, a crater created by past eruptions, is 2,155 meters (7,071 feet) above sea level and is hemmed in on three sides by steep mountains. Through an opening on the northern side rushes a 68-meter-high (223 feet) waterfall, the source of the Sunga River. Countless hot springs flow the year round, the highest water temperature being 80°C (176°F). Many public hot baths have been built, and there are prospects for

A fine view of the Changpai Mountains Nature Reserve in Kirin Province. The mountain range runs north and east from the border of North Korea into the northeastern part of China.

Like many mountainous areas, the Changpai Mountains Nature Reserve has many ecosystems, including the three shown here. This area was designated a Biosphere Reserve in 1979 under UNESCO's Man and the Biosphere Program.

the integrated utilization of the terrestrial heat.

The forest in the Changpai Mountains is composed of coniferous and broad-leaved temperate zone species and is one of the major forest regions in China. More than 1,500 species of vascular plants have been identified, 800 of economic value. The slopes are covered with many luxuriant trees, including *Pinus Koraiensis, Larix olgensis, Picea asperata, Fraxinus mandshurica,* and *Phellodendron amurense. Pinus sylvestris* in the Changpai Mountains reaches heights of 20 to 30 meters (66 to 99 feet). It grows very fast in the poor volcanic soil and is not subject to insect pests and disease. There are also more than 300 species of medicinal herbs plus plant resources from which oils, aromatics, and dyes can be extracted as well as furnishing raw materials for paper making, beverages, and food. On the rotten wood grows a great quantity of fungus and various mushrooms. Some of the wild plants are extensively used already, and others are being studied for future use.

The forests are inhabited by more than 50 species of animals, more than 300 species of birds, almost 10 species of reptiles, more than 10 species of amphibians, more than 10 species of fish, and more than 1,000 species of insects. Eighty percent of the birds are insectivorous. As natural enemies of forest pests, they play an important role in protection. Before 1949 some valuable animals such as the Northeast China tiger, sable, Sika deer, lynx, and common otter decreased in number as a result of arbitrary hunting, but after the founding of the People's Republic the government at various levels promulgated hunting regulations and established nature reserves to create favorable conditions for reproduction of the valuable and rare animals. The protection has resulted in a marked increase in wildlife, including those animals formerly on the verge of extinction.

Since the establishment of the nature reserve, the staff has worked out administrative regulations and rules. Education and extension of scientific knowledge about the conservation of natural resources have been conducted in various ways. Pasted on the wall of every household in the province is a list of precautions to take to prevent outbreaks of fire, and every family is supplied with fire extinguishers and other fire-fighting equipment. Slogans, prominently displayed in public places, act as constant reminders: "To protect the forest and prevent fires is everybody's job," "Make our country green," "Work for the benefit of future generations." Wrapping paper used by shops and postage stamps call on people to protect the forest and prevent fires. Good results have been achieved through these measures.

Those who have helped develop the area surmounted many difficulties in the course of building forest roads, houses, and other necessities. In cooperation with the local people, they carried out joint conservation efforts in forest protection and fire prevention, creating favorable conditions for conservation and developing the area's natural resources. At the same time, the economy was diversified to include bee keeping, medicine making, vegetable planting, and the processing of small wooden

Flowers and low growing shrubs carpet this elfin woodland in the Nature Reserve. The dominant species is Betula ermanii.

wares from wind-fall trees and pruning. All this supplied the market with products and brought in income.

Observation stations to study the forest ecosystem were established in the reserve in 1979, and research on the structure, functions, and productivity of the ecosystem began. In 1980 the reserve became part of UNESCO's Man and the Biosphere program. At present, eight colleges, universities, and institutions are carrying out studies on forest felling and regeneration, meteorology, pedology, animals and plants, diseases and insect pests, and tree physiology. Useful data have been collected about biological resources which will aid in conservation and administration.

A nature reserve is a classroom where people can learn about nature as well as find recreation. With rising living standards, more and more people are interested in visiting natural settings and enjoying nature. From late spring to autumn, more than 40,000 visitors pursue a diversity of interests in the Changpai Mountains Nature Reserve, enriching their lives and increasing their knowledge.

Many achievements have marked the administrative work done in the nature reserve over the past decades, but there are still difficulties and problems. Regulations and rules are incomplete, and others are needed to fit new situations and problems. The reserve lacks a unified administration, which gives rise to arbitrary exploitation and construction by the departments of tourism, physical training, water conservation, electric power, etc. Highways, hotels, power stations, and other facilities have been built in the reserve to the detriment of vegetation and natural landscapes. Some tourists violate conservation rules and deposit rubbish, pick flowers and tree branches, and trample flowers and grass. These actions harm the environment and damage some plants, including valuable ones. Technicians make up only 17 percent of the total staff on the reserve, limiting the development of scientific administration. In addition, insufficient funds prevent management from making greater and faster improvements.

Measures are being taken to solve these problems. The Commission on Man and the Biosphere in China and the Forestry School of China recently held a national academic seminar at which some theoretical and practical problems were discussed and experiences in management were exchanged. The seminar pointed out that nature conservation is a vital necessity and appealed to the whole nation to pay attention to and support this cause. It also made the following recommendations:

- The construction of nature reserves should be put into the national economic plan in order to ensure necessary funds and materials.
- There should be unified leadership and administration of nature reserves; all activities in the reserves must adhere to the principles of conservation, and various administrative departments in the reserves should not be permitted to go their own way. (The People's Government of Kirin Province has recently taken steps along these lines in regard to the Changpai Mountains Nature Reserve.)
- Legal sanctions should be strengthened and strictly administered, and the system of rewards and penalties should be implemented. The State Council had promulgated "Forest Law" and "Law of Environment Protection," and it is suggested that "Regulations for Nature Reserves Administration" and other laws should be formulated as well.
- Education needs to be energetically strengthened in order to increase people's awareness of the importance of conservation. Courses should be offered in colleges of forestry, and the subject should be covered in textbooks for primary and secondary school students. Training courses should be run by departments at both the central and provincial level to prepare scientists and technicians to work in nature reserves. (The Ministry of Forestry now has such a course.)

More nature reserves will be set aside in China in the coming years. We believe that with the continuous development of the nature conservation cause in China the management of the Changpai Mountains Nature Reserve and others like it will unceasingly improve.

Chao Ching Ju, a forestry research officer, is Director of International Exchanges for the Chinese Academy of Forestry in Beijing.

Felicia C. Coleman and D.H.S. Wehle

Plastic Pollution: A Worldwide Oceanic Problem

From Newfoundland to Australia, biologists studying seabird feeding ecology in the early 1970s started noticing an odd prey item in their subjects' diets: plastic. Their tales were soon joined by similar ones of plastic ingestion and entanglement in plastic debris, in a wide variety of marine organisms including fish off the southern New England coast, sea turtles off Costa Rica and Japan, and whales in the North Atlantic. At the same time, scientists conducting planktonic and benthic surveys in both the Atlantic and Pacific oceans found unprecedented numbers of plastic particles among their samples [Feder et al., 1978; Colton et al., 1974], and members of both Ra expeditions observed plastic pollution while crossing the Atlantic [Heyerdahl, 1971]. Plastic pellets washed ashore in New Zealand in such large quantities that some beaches literally seemed covered with "plastic sand" [Gregory, 1978]. By the close of the decade, a new problem had been added to a growing list of ecological concerns—plastics at sea.

Plastic shows up in the marine environment in two forms: manufactured pieces and raw particles. Those who frequent coastal regions are painfully aware of the prevalence of manufactured plastic litter along the shore. Most of this refuse is generated by transport, fishing, and recreational vessels. In 1975, the US National Academy of Sciences estimated that commercial fishing fleets alone dumped more than 52 million pounds of plastic packaging material into the sea, and probably lost more than 298 million pounds of plastic fishing gear, including nets, lines, and buoys [Merrell, 1980].

Raw plastic particles — the spherules, nibs, cylinders, beads, pills, and pellets (each about the size of a wooden match head) from which products are manufactured — enter the ocean via inland waterways and outfalls from plastic manufacturing plants. They are also lost from freighters during loading and unloading, and, upon occasion, are deliberately dumped into the sea.

However it manages to reach the sea, plastic debris is ubiquitous. It has turned up in benthic sediments along the industrialized coast of Great Britain in concentrations of 2,000 pieces per square meter [Morris & Hamilton, 1974]; near Aukland, New Zealand, at densities greater than 100,000 pieces per lineal meter of beach [Gregory, 1978]; in the Mediterranean Sea as enormous floating masses [Morris, 1980]; and in coastal regions of the United States, Portugal, Colombia, Lebanon, and such remote sites as the Aleutian and Galapagos Islands. Members of the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) — a nationally coordinated program of the US National Marine Fisheries Service (NMFS)—found large quantities of raw platics in the open ocean, particularly in the Sargasso Sea, an area in which floating debris is known to accumulate; this would indicate that winds and currents play an important role in distributing and concentrating particles in certain oceanographic regions. Given the presence of plastic particles in the marine environment, it was only a matter of time before they turned up in the digestive systems of animals that forage at sea.

One of the earlier known occurrences of plastic ingestion was in 1962 for an adult Leach's storm-petrel collected off Newfoundland [Rothstein, 1973]. In 1966, researchers in the Hawaiian islands found plastic in the stomach contents of nestling Laysan albatrosses, indicating that the parents had picked up the plastic as "prey" and fed it to their young [Kenyon & Kridler, 1969].

As the data accumulated, certain patterns emerged: for example, in the Northern Hemisphere, North Pacific and North Atlantic procellariids (particularly shearwaters and fulmars) and North Pacific alcids (particularly auklets and puffins) contained more plastic material than other seabirds in those areas, including phalaropes, gulls, terns [Day, 1980]. To date approximately 15 percent of the worlds' 280 species of seabirds are known to ingest plastic.

While seabirds choose from a wide array of plastic objects during foraging (including raw particles, fragments of processed

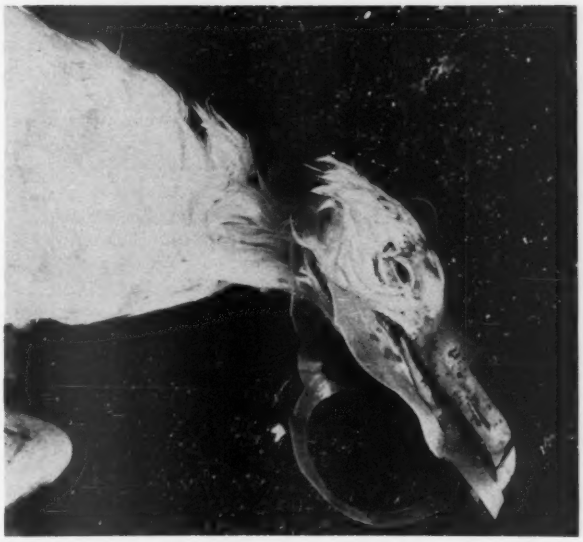


photo by Charles O'Claire, NMFS

The death of this gull can be attributed directly to the plastic yoke from a six-pack of drink cans. These yokes are almost invisible in the water, and both divers and surface water feeders are particularly susceptible to such entrapment.

products, detergent bottle caps, and toy soldiers, cars, and animals), marine turtles consistently select only one item — plastic (polyethylene) bags. In the past fifteen years, biologists have found plastic bags in the digestive tracts of four of the seven species of marine turtles: including leatherbacks off the coast of the US, French Guiana, South Africa, and France; hawkbills on the Caribbean coast of Costa Rica; greens in the South China Sea, and in Japanese, Australian, and Central American coastal waters; and olive ridleys in the Pacific coastal waters of Mexico. Polystyrene spherules have been found in the digestive tracts of one species of chaetognath (transparent wormlike animals) and eight species of fish in southern New England waters [Carpenter et al., 1972]. They have also turned up in several species of bottom-dwelling fishes in the Severn Estuary of southwestern Great Britain [Kartar et al., 1976].

Marine mammals are not exempt from participation in the plastic feast. Pygmy sperm whales, rough-toothed dolphins, Cuvier's beaked whale, and West Indian manatees are all involved, eating mostly plastic sheeting or bags. Fishermen report Minke whales eating plastic debris thrown from commercial fishing vessels. Curiously, plastic has not been found in any of the thousands of Alaskan ribbon, bearded, harbor, spotted, ringed or northern fur seal stomachs examined.

The obvious question arising from this mish-mash of data is, Why do marine animals eat plastic? Robert H. Day (1980), in the most comprehensive study of plastic ingestion to date, maintains that seabirds, at least in Alaska, eat plastic because they mistake it for natural prey items. For example, in all the parakeet auklets Day examined, most (94%) of the ingested plastic consisted of small, light brown pieces that bore a striking morphological resemblance to the small crustaceans on which the birds typically feed.

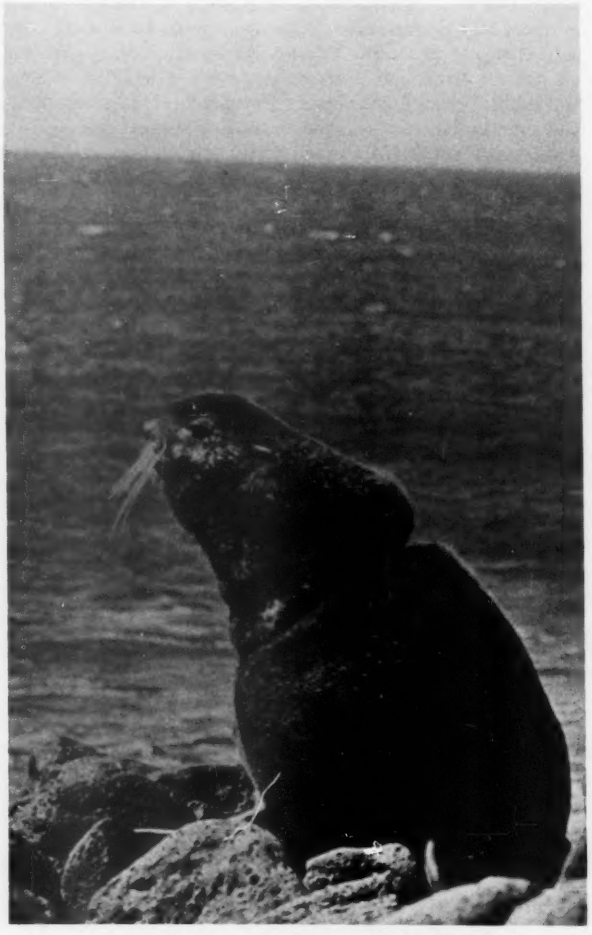
Marine turtles also seem to mistake plastic objects for potential food items. For turtles, transparent polyethylene bags apparently evoke the same feeding response as do jellyfish, the major food item of leatherback turtles, and subsidiary prey for greens, hawkbills, loggerheads, and ridleys.

Sea birds, marine turtles, and marine mammals all eat plastic. So what? It could be that plastic ingestion is inconsequential to their health. After all, a cow can retain nails, metal staples, and strands of barbed wire in its stomach for more than a year with no ill effects. This, however, does not appear to be the case for many marine organisms that eat plastic. George R. Hughes (pers. comm.) of the Natal Parks Board, South Africa, extracted an enormous ball of plastic from the gut of an emaciated leatherback turtle; unravelled, the plastic measured three meters wide and four meters long. The plastic ball completely obstructed the turtle's normal digestion and presumably led to its malnourished condition. Similarly, a mass mortality of green turtles off the Costa Rica is attributed to the turtles' ingestion of plastic banana bags thrown from a dock [Cornelius, 1975].

We know that plastic is virtually indigestible and that individual pieces may accumulate and persist in the gut for extended periods of time. A growing body of evidence indicates that ingested plastic causes a multitude of gastro-intestinal problems. It may reduce an animal's hunger sensation, and thus inhibit feeding activity; this, in turn, could result in low fat reserves and an inability to meet the increased energy demands of either reproduction or migration [Connors & Smith, 1982]. Plastic may cause ulcerations in the stomach and intestinal linings, and is suspected of damaging other anatomical structures, such as the delicate fringe used in prey capture on the bills of prions. Finally, plastic ingestion may contribute to the level of synthetic chemicals in body tissues. Some plastics contain PCBs, a chemical known to cause eggshell thinning, aberrant behavior, and tissue damage; others, such as polystyrene spherules are not made with PCBs, but apparently absorb them from ambient sea water [Carpenter et al., 1972]. Some plasticizers concentrate in fatty tissues; when these highly contaminated tissues are mobilized for energy, toxins may be released in lethal doses.

Publication of data on plastic ingestion is in its infancy. As the problem gains notoriety, it is certain to be revealed as being even more widespread than is now recognized. One indication of this is the occurrence of secondary ingestion, in which plastic consumed by animals feeding at low trophic levels is plassed on through them to higher-level consumers. Plastic pellets found in the castings of a predatory South Polar skua in the South Atlantic apparently got there by way of a broad-billed prion eaten by the skua [Bourne & Imber, in press]; plastic pellets found in the Galapagos Islands came from transport vessels in Ecuadorean ports through a food chain involving fish, blue-footed boobies, and finally, short-eared owls [Anonymous, 1981].

A more obvious effect of plastic pollution is the aesthetic one. Whether we venture deep into the woods, high atop a mountain, or out on the ocean to escape the trappings of civilization, our



This fur seal is girdled by a discarded plastic band used for strapping closed large boxes or similar containers. The material is water and rot resistant, and this animal has little hope of survival. As it grows the band will cut deeper and deeper into the flesh, causing increasing pain and a lingering death.

experience of the natural world is often marred by the discovery of human litter. Even more disturbing is the sight of a young pelican entangled in fishing line and dangling helplessly from its nest, a whale rising to the surface with its flukes enshrouded in netting, or a seal nursing wounds caused by a plastic band cutting into its flesh. Unfortunately, such observations are becoming more and more common, another consequence of plastics at sea.

During the last 20 years, fishing pressure has increased dramatically in all the world's oceans, and with it, the amount of fishing-related debris dumped at sea. With the advent of synthetic fibers after World War II, the type of fishing equipment shifted from the traditional nets of hemp, cotton, or flax (which sank if not buoyed, disintegrated within a relatively short period of time, and which because of the size of their fibers, were largely avoided by diving seabirds and marine mammals) to synthetic monofilament nets, which are more buoyant and longer-lived than their predecessors, and nearly invisible under water, a distinct disadvantage to animal in the net's vicinity.

One result of the change in net materials has been an increase in mortality of air-breathing animals either through incidental capture or entanglement. Incidental catch refers to the capture of non-target animals in actively working fishing nets; entanglement is the capture of any animal in lost or discarded nets. Unlike working nets, which fish for specified periods of time, these free-floating nets, often broken into fragments, fish indefinitely. When washed ashore, they may also threaten land birds and mammals: in the Aleutian Islands, a reindeer became entangled and died in a Japanese gill net that had washed up on the beach. During the heyday (1972-76) of the Danish salmon fishery in the North Atlantic, the incidental catch of thick-billed murres reached three quarters of a million birds a year [Bourne, 1971; Tull et al., 1972]; in 1980, the incidental catch of sea turtles in shrimp trawl nets off the southeastern coast of the United States was around 2,000 animals. Some government officials estimate that about 50,000 northern fur seals currently die in the North Pacific each year as a result of entanglement in fishing gear.

While not fishing-related in the usual commercial sense, there are incidences of capture of cetaceans and sea turtles off the coast of Natal each year. Natal's beaches are important to the economy of the area. A number of shark attacks along those beaches during the height of the resort season proved nearly disastrous to local businesses. In an effort to rectify this, park officials set gillnets offshore to keep sharks from moving in near bathers. While effectively, but not selectively, taking sharks, the nets also caught cetaceans moving inshore to feed on small fish, and turtles coming in to nest [Best & Ross, 1977]. The local officials now find themselves in an awkward position, faced not only with the problem of shark attack, but with receiving a good deal of bad press relating to the capture of marine mammals. They are working to alleviate the problem through close monitoring of beaches: forbidding swimming and rolling up nets during periods of cetacean and/or turtle migration inshore.

Plastic strapping bands, used to secure crates, bundles of netting, and other cargo, are another common form of ship-generated debris that is harmful to marine mammals [Merrell, 1980]. Discarded bands are often found girdling pinnipeds (e.g., seals and sea lions), animals that are particularly susceptible to entanglement because of their proclivity for examining floating objects. Sea birds that frequent recreational waters or coastal dumps, such as gulls and terns, are subject to ringing by the plastic yokes used to package six-packs of beer and soft drinks. With the rings caught round their necks, the birds may be strangled when the free end of the yoke snags a protruding object. Pelicans, which plunge-dive to feed, run the risk of diving beak-first into yokes thrown in the water. With a ring firmly wedged around its bill, the bird is unable to feed and may well die of starvation.

This derelict trawl web net that washed ashore on Amchitka Island is a common site. Free-floating synthetic monofilament nets are also frequently seen, both ashore and floating at sea — a potential danger to birds and animals wherever they appear.

The problem of plastics at sea is global and its solution will require international cooperation. Historically, the high seas have been considered an international no-man's land. Recently, however, perception of the ocean as a finite and shared resource has caused many nations to express concern for its well-being.

In 1970, the U.S. Congress passed the National Environmental Policy Act, which, among other things, led to the adoption of a number of laws on waste disposal, two of which included pollution by plastics. Having laws on the books, however, does not solve the problem. Small scale refuse disposal on the high seas is difficult to regulate; fishermen who unintentionally lose their nets at sea cannot be held responsible; and illegal large-scale dumping at sea is hard to detect. Granted, laws must be more stringent, but enforcement is really the bigger problem.

On the international level, the United Nation's Conference on the Human Environment, held in Stockholm in 1972, highlighted water pollution and litter in the ocean. The conference, representing 110 nations, defined the need for international policy on marine pollution among coastal and maritime nations. Treaties to implement such a policy soon followed: the 1972 London Convention on the Prevention of Water Pollution by Dumping of Wastes and Other Matter (Ocean Dumping Convention), a part of

which specifically prohibits marine dumping of persistent plastic material; and the 1973 London International Convention for the Prevention of Pollution from Ships (Marine Pollution Convention), which is broader in scope, regulating the control of oil pollution, packaged substances, sewage, and garbage [Moore, 1975]. While neither treaty has been adopted by all nations, each represents a start toward global control of marine pollution.

Ironically, the very characteristics that make plastic appropriate for so many uses—its lightweight, strength and durability—lead to the majority of problems associated with its occurence at sea. The longevity of plastics in seawater is not known, but on the beach, particles may last anywhere from 5 to more than 50 years. Given plastic's long life, our handling of plastic pollutors, and the projected annual increase in production [Guillet, 1974], one thing is clear—the rate of plastic deposition in the marine environment will remain higher than the rate of its disappearance. In a study of plastic accumulation rate on the beaches of Amchitka Island, Theodore R. Merrell, Jr., (NMFS) recorded 550 pounds of plastic litter added to less than a mile of beach in one year [Merrell, 1980]. He also found a 250 percent increase in both the number and weight of plastic items washed ashore over a two year period.

Outside the realm of laws and treaties, immediate remedies to continued plastic pollution can be generated both within and outside of the plastics industry. We already have the technology to manufacture biodegradable plastics. In fact, one of the beauties in plastic is its maleability: its properties can be altered and its life expectancy prescribed. Alaska is ahead of the game, in this respect. Alaskan law already requires that plastic six-pack yokes be made of a self-destructing compound. But are the compounds released by degradation more harmful than the intact plastic? This is an important fact to consider.

Another, but perhaps less workable solution (given the logistics and expense involved, and the degree of business and public cooperation required) lies in recyclable plastics. At the very least, all countries should require that the outflow from industrial plants be filtered for plastic particles before it enters the waterways. A recent decline in the uptake of plastic by marine organisms in southwestern England has been attributed, in part, to the efforts of one of the major contaminating plants to filter, collect, and reuse raw particles present in its effluent.

Consumers share with industry the responsibility to reduce plastic pollution. Recreational boaters and commercial fishermen discard plastic refuse that would better be held onboard until they return to port. If six-pack yokes or strapping bands must be discarded at sea, the rings should be cut first so that they pose less of a threat to marine animals; other plastic refuse generated on large vessels could be burned in nonatmospheric polluting incinerators or compacted for shore disposal.

The first step in combatting plastic pollution is to alert both industry and the general public to the gravity of the problem and the urgency of doing something about it. Park management is in a unique position in this regard. It is often through the park system that people acquire a reverence for the natural environment, and pick up on ways to illustrate that respect. Education alone won't solve it, but it is a start. Public awareness of the problem, combined with the resolve to correct it, can bring dramatic results.

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Felicia C. Coleman and D.H.S. Wehle are both instructors at the Shoals Marine Laboratory, Cornell University, USA.

Unless otherwise noted, photos are by Dr. Theodore Merrell, National Marine Fishery Service.

J.H. Grobler

Management Planning: The Natal Parks Board (RSA) Approach

A co-ordinated systematic approach to planning for management of conservation areas has become essential with the increase in our knowledge of natural systems, and of man's influence on them. The officer-in-charge of a reserve, faced with a mass of information and several options to a single problem, is no longer in a position where *ad hoc* decisions may be taken. Decisions must now be looked at in the context of the total reserve situation, and related to an integrated approach based on best available information. It is the work of a "planner" to collect the available information on a reserve, to synthesise this, collate, document and disseminate it in the form of a management plan for the area.

There are various ways in which this may be achieved and the approach outlined below is used by the Natal Parks Board (RSA) Conservation Division. In this system, management plans are written by staff (mainly research staff and officers-in-charge of reserves) and edited by the planner in the Research Section of the Conservation Division. Once the document is complete and meets the required standard, it is submitted to the Directorate and the Natal Parks Board for their approval before it can be carried out.

Revisions and amendments to the plan are discussed at management meetings which are held approximately every six months for each reserve and attended by all staff associated with the area. Any action required is delegated to members at the meeting, who will then do the necessary work, including obtaining required approval from higher authorities. It is the responsibility of the planner to ensure all amendments are incorporated into the plan and that the plan is revised when necessary. The officer-in-charge has the responsibility of implementing the management plan.

The Management Plan

Management plans are drawn up for each reserve following an approved format, and are captured on a word processor to assist in updating and amending documents. The purpose of a management plan is to document all relevant information which exists about the reserve; to state the objectives, determine the different types of land use within the reserve (zonation) and to set out the future management of the area. The plan also provides for details such as annotated faunal and floral species lists. The plans are thus divided into three major parts:

Part I Information Section
Part II Objectives, Zonation and Management Programme
Part III Appendices

The length of each part will vary according to the size of the reserve and the available information. For large reserves, each part will form a separate document because of the bulk. The plan is divided into 15 chapters, each with major sub-headings, and these are summarized in Table 1. The same format is used for all reserves even though some sections may not apply, and the headings are used as agenda points for management meetings to ensure field staff have the opportunity to comment at all levels.

The Influence of Policy

Management planning must be within the framework of an approved policy, and this should be more than a broad based policy. The Natal Parks Board's aim in conservation, for example, is to

One of the major objectives is "to conserve... appropriate indigenous species and their habitats." These healthy gemsbok (oryx) indicate the ability of native species to thrive in a harsh environment.

Visitors to rugged coastlines often do not realize the areas are fragile and susceptible to severe damage from thoughtless human uses. Management practices can guide and control human intrusion.

promote the wise use of natural resources in perpetuity, and to prevent degradation of the environment. However, there is a need for policy pertaining specifically to different aspects of reserve management. Once a policy has been determined, objectives can be set to ensure that mangement practices are within the framework of the policy.

From the broad based conservation policy stated above, two major objectives were formulated, the primary objective of reserves, which is:

> ". . . to conserve the optimum number of appropriate indigenous (to the reserve) species and their habitats, maintain breeding populations and protect the specificity of these gene pools. Natural, physical and ecological processes will be allowed to operate without interference except under imperative circumstances."

The major secondary objective was identified as:

> ". . . to allow utilization of the reserve for educational, research and recreational purposes, provided that these activities are compatible with the primary objective. Further, that any imperative consumptive utilization of a renewable natural resource must be demonstrably not in conflict with the primary objective."

These major objectives influenced some of the more specific policies; the policy on fencing, for example, states:

> "To erect and maintain suitable fences so as to control animal movement; to demarcate boundaries of the reserve; and to protect personnel and their possessions or any equipment and buildings against theft, damage or destruction from human or animal sources, without hindrance to achievement of the *primary objective.*"

With each policy statement in mind, objectives can be set and a programme dawn up for the management of the area, which in essence would result in the best decision being made and increased efficiency in effort.

Where possible, policies are in line with nationally and/or internationally accepted practices and standards. The section dealing with zonation, for example, uses categories as proposed by the IUCN; and special attention is given to species appearing in the Red Data Books. Once a policy has been accepted and approved by the Board, proposed changes must be strongly motivated before they are considered.

Planners are often seen as decision makers, but their main role is as coordinator of ideas and available information which can then be used to rationalise decision making. Planners also help generate concepts. They may participate in joint decisions at management meetings. The planning process is not linear, but dynamic. It is ongoing and does not end with the approval of a management plan. In this respect there has been a major development with the use of word processors. Management plans came before their time; they were good in theory, but difficult to use in practice. The word processor has now given us the tool to turn plans into dynamic documents which can be updated or revised without difficulty.

The management plans of the 44 reserves administered by the Natal Parks Board's Conservation Division are still in the process of being prepared or revised, and it is only recently that a programme was initiated to capture these on a word processor. By the end of 1983 there were 24 plans either complete or in draft form nearing completion, and of these, 11 were captured on the word processor. All new or revised plans are being captured and the use of this technique has already proved successful.

The management plans are part of the overall management strategy of the Conservation Division of the Natal Parks Board. Goals are set within the division and these are reviewed annually in order to record progress, achievements, shortcomings and failures. The data in this respect are recorded in an annual division

Table 1. Major headings used in Natal Parks Board Management Plans

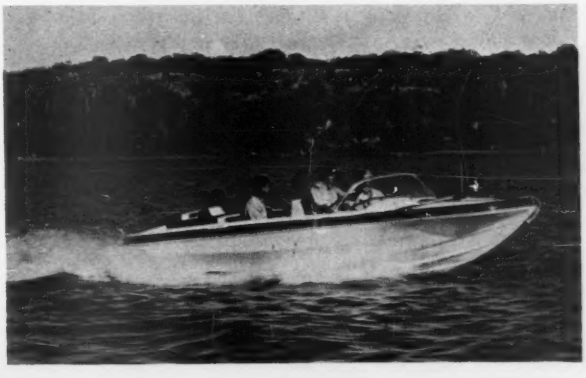
PART I	INFORMATION
CHAPTER 1	GENERAL INFORMATION
1.1	Legal establishment
1.2	Geographic location
CHAPTER 2	REASONS FOR ESTABLISHMENT
CHAPTER 3	DESCRIPTION
3.1	History prior to Board control
3.2	Natural inventory
CHAPTER 4	PAST MANAGEMENT, RESEARCH AND RESULTS
4.1	Soils
4.2	Vegetation
4.3	Fauna
4.4	Archaeology, palaeontology and historical
4.5	Water
4.6	Pollution
4.7	Unique, valuable and sensitive features
CHAPTER 5	ADMINISTRATIVE MANAGEMENT
5.1	Buildings
5.2	Communications
5.3	Energy and water supplies
5.4	Fencing
5.5	Domestic regulations
5.6	Resident human population
5.7	Civil emergency procedure
5.8	Tariffs
5.9	Socio-political influences
5.10	Land acquisition
5.11	Law enforcement
CHAPTER 6	VISITOR SERVICES
6.1	Control of visitor numbers and vehicles
6.2	Picnic sites, view sites, hides and car parks
6.3	Rest camps, bush camps, camping grounds, caravan parks, wilderness trails, mountain huts and caves
6.4	Day trails and nature walks
6.5	Educational facilities and information services
6.6	Recreation facilities including boating and fishing
6.7	Indemnity notices and rules
CHAPTER 7	FINANCIAL ASPECTS
7.1	Annual budget
7.2	Procedure
PART II	OBJECTIVES, ZONATION, MANAGEMENT PROGRAMME
CHAPTER 8	OBJECTIVES
8.1	Primary objective
8.2	Secondary objective
CHAPTER 9	ZONATION
9.1	Land use categories
9.2	Intensive use zone
9.3	Limited use zone
9.4	Wilderness zone
9.5	Special zone
CHAPTER 10	PRESENT AND FUTURE MANAGEMENT PROGRAMME (Headings as in Chap. 4)
CHAPTER 11	RESEARCH
11.1	Procedure for identifying priority projects
11.2	Current projects
11.3	Future projects
11.4	Standard monitoring system
CHAPTER 12	ADMINISTRATIVE MANAGEMENT (Headings as in Chap. 5 but excluding 5.6)
CHAPTER 13	VISITOR SERVICES (Headings as in Chap. 6)
CHAPTER 14	STAFF
14.1	Officer establishment
14.2	Other rank establishment
14.3	Honorary Officers
CHAPTER 15	FINANCIAL PRIORITIES (Headings as in Chap. 7)
AUTHORSHIP	
ACKNOWLEDGEMENTS	
REFERENCES	
PART III	APPENDICES

report, which gives satistics for a four-year roll-over period. This enables assessment of trends which can be used for future planning, and for measuring achievements. Dynamic management plans are an essential part of this conservation strategy and if applied correctly, will play a major part in streamlining conservation effort.

J. H. Grobler is the Chief Professional Officer (Planning) for the Natal Parks Board.

Photographs courtesy of the US National Park Service

Water areas present still another management challenge. If properly regulated, they can provide a wide variety of activities without interfering with the natural ecological processes.



PARK VIEWPOINTS

Small is a Can of Vermicelli

Regionalisation—broadly defined as any political shift which tends to remove care and protection of the environment from central government control—has long formed part of the manifesto of the 'ecology moment' in Europe. Its appeal is summed up in texts like Schumacher's Small is Beautiful: *a small scale 'Ecotopia' where social control is exercised in the interest not of capital or labour but of the native resource base. It is a feasible alternative to existing, large-scale systems of government which are insensitive to natural and local realities and which 'rob Peter to pay Paul' when resources run low. This ideology has also been borrowed by secessionist movements, by land reform enthusiasts and—not least—by governments thankful for an excuse to unload burdensome amenity and environment portfolios onto local authorities less able or willing than they to handle them properly.*

In many European countries, devolution of powers vested nationally or internationally (such as administration of national parks or observance of international conventions like CITES) onto local authorities is not a matter of choice but a statutory obligation, imposed by a centrifugal constitution. More complications arise when multi-governmental alliances like the European Community impose still further limitations on powers centered nationally.

Parks and conventions are not the only likely hostages of the regionalisation process: the control of transboundary pollution or of epidemic diseases of wild plants and animals could also be affected; so, too, could the terms of reference of national conservation strategies, and other large-scale conservation initiatives. What many of regionalisation's supporters thought would turn out as a smart way to finesse the highway-building, army-exercising, waste-dumping powers of central governments, could easily turn out to be a loophole through which a precious environmental heritage could disappear without trace.

Regionalisation is in full swing at present in France, Spain, Italy and several other European countries. What is the real nature of the risks and benefits involved? FRANCESCO FRAMARIN, a member of IUCN's Commission on National Parks and Protected Areas and former Director of Parco Nazionale Gran Paradiso in Italy, looks at a recent object lesson in the problems regionalisation can pose to national parks administration.

Transferring State powers and functions to regional or provincial administrations has been justified on grounds both political (to achieve greater democracy) and technical (to provide a more tailor-made and efficient service); have these advantages materialised in the case of Italy's national parks which have been undergoing regionalisation for more than ten years now, or was this contradiction in terms prognostic of a disastrous clash of interests?

From the early 1970s, a growing lobby pressed for regionalising the running of Italy's four existing national parks, two of which (Stelvio and Gran Paradiso) are in the Alps, one in the Apennines (Abruzzo) and another (Circeo) on the coast south of

Italy's regions and major national parks.

Rome. Legislation was passed to ensure more local representation on the managing committees of these parks. In one case, this obligation exceeded necessity; Gran Paradiso is now effectively a regional park in all but name. Two of Italy's near-autonomous alpine regions are still clamouring for complete power over their shares of Stelvio and Gran Paradiso. Elsewhere in Italy, regions which have been proposed as sites for new national parks are doing all they can to avoid this distinction.

What do Italian conservationists make of the regionalisation trend, ten years on? Few ever had much praise for the attitude of the State towards conservation as a whole and national parks in particular. No new national parks have been created (except on paper) since 1935. Though each was much enlarged in 1978, the four that exist add up, together, to less than one percent of Italy's area. There never was a unified service set up to run them: Stelvio and Circeo were entrusted to the State Forest Service, the other two hived off to separate, quasi-governmental agencies. There was always a shortage of government money to help run them properly, though there was a steady increase in the number of visitors and hence in management needs. The Forest Service's stewardship left most to be desired and the parks in their care are still in visibly worse shape than the others.

Faced with this dismal record, many Italian conservationists felt that regional management could hardly be worse than the State's and might even be an improvement: above all, they saw a good chance to create new parks and reserves as part of the regionalisation process. The "ten percent challenge" was launched, a bid to protect a tenth of Italy. Three percent was to lie in the four

old plus eight new national parks and reserves, the rest in regional parks and reserves. An annual management budget of $30 million was proposed — no more than is spent by the State on subsidising opera and only a tenth of the net budget of the smallest regional authority.

But regional autonomy has, far from winning ground for conservation, closed the door on any such plan. Almost every region which has part of a national park within its territory has allowed itself to be influenced by local pressure to lift management controls. None of the regional authorities has solved the national parks' cash problem, though all of them are happy enough to use them as status symbols and tourist attractions, and reap the revenue and cultural progress they generate. Local authorities have allowed environmentally destructive public works (such as highways and ski-lifts) to mar the national parks. Yet many of the regions concerned cannot claim to be beggars rather than choosers in these matters: the alpine regions of Val d'Aosta and Sudtirol are (in terms of *per capita* wealth) among Italy's richest. Yet Sudtirol claimed economic necessity when it overruled the Stelvio National Park authorities and allowed hunting of wild ungulates and even of the rare capercaillie within the park boundaries, an abuse which has now been controlled, for the time being at least.

As for the regions where the new national parks were to be sited, fierce local opposition has, in almost every case except Piedmont's, deadlocked the best-laid plans. This negative reaction certainly mirrors general opposition to State control of any kind. The main opposition party in Italy, frustrated in its efforts to gain central power, has thrown its weight behind local autonomy, reinforcing this reaction. It also reflects — alas — a dyed-in-the-wool disregard for nature: some of the most spectacular among the sites proposed as new parks are not under any form of protection and are in a state of serious environmental decline. Many, moreover, are on boundaries between two or several regions because they are mountains, rivers or other commanding geographical features. To protect them would require far more collaboration between regions than they have yet shown themselves capable of.

How did this depressing and seemingly irreversible situation come about? The underlying problem is that local authorities are far more at the mercy of vested interests like hunters, timber enterprises or tourism developers, than is the State, no matter what its other limitations may be. I suspect Italy's negative experience of regionalisation of national parks is not an isolated instance peculiar to one Mediterranean country, but an encounter likely to be repeated or paralleled in many other places in the near future. It is also an illustration of general principle which we ignore at our peril. The conservation of nature is not equivalent to the sum of many small, sectional interests. It feeds on an ethic which is essentially global and idealistic, not individual and utilitarian. People are the same whatever institutions mould their behaviour, but institutions act according to their structure, aim and habit. By this reckoning, local administrations could never be expert or even-handed enough to bear the responsibility of maintaining so vulnerable and precious a heritage as our national parks: if these are to be anything other than national, let them be international concerns.

IUCN Bulletin, Jan/Mar, 1984

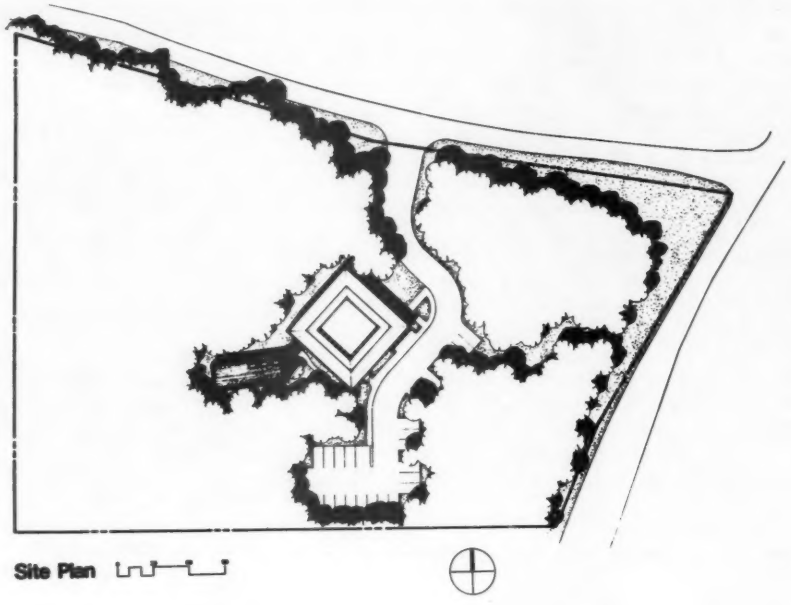
Photo: Bill Wade, Delaware Water Gap NRA

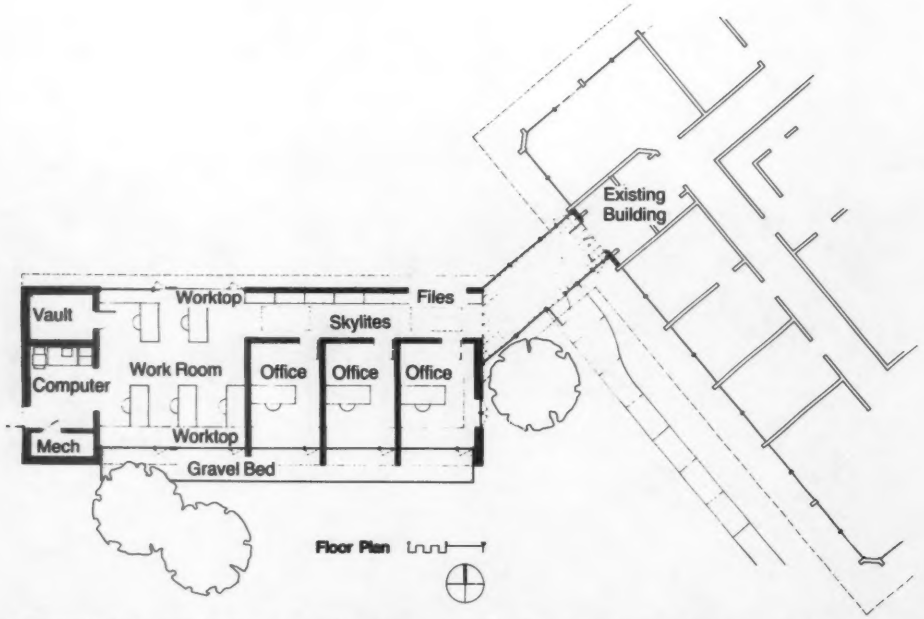
Caroni Swamp National Park, Trinidad-Tobago—habitat of the national bird, the scarlet ibis

PARK TECHNIQUES

Energy Efficient Park Office Addition

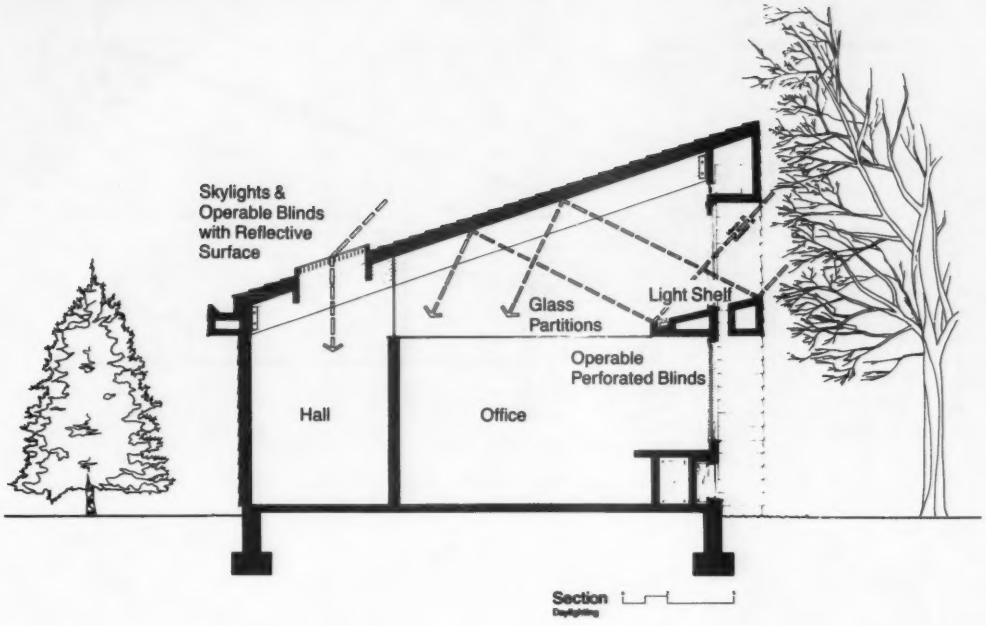
The Northern Virginia Regional Park Authority (USA) commissioned Lawrence Cook AIA and Associates of Falls Church, Virginia, to design an energy efficient 1,500 square-foot (140 m²) office addition to an existing 5,000 square-foot administration building. The building is located outside of Washington, D.C. on a three-acre, heavily wooded site.





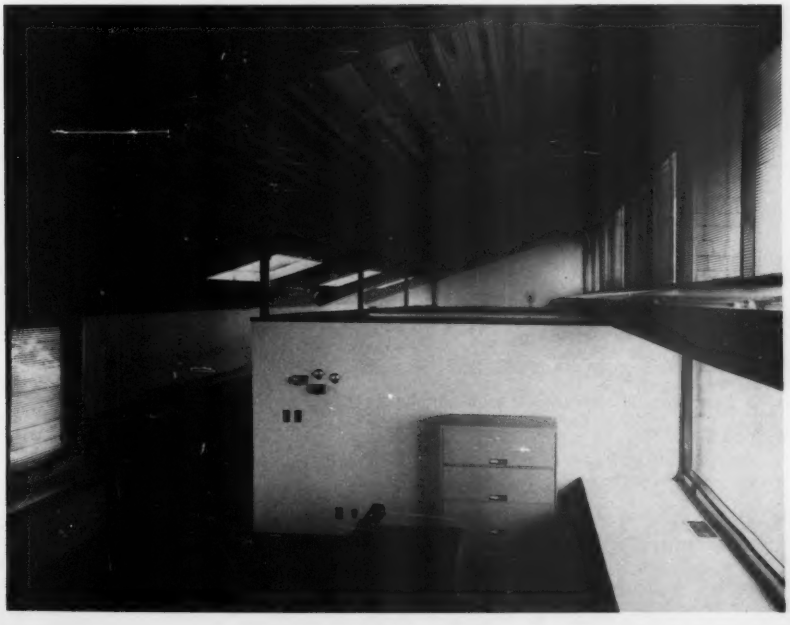
The architect's approach was to examine the staff's working patterns, the various functions of the staff and the size of the addition. This analysis showed that natural daylighting would provide the greatest energy savings while heating and cooling could offer still more savings. By the use of siting, glazing, a light shelf, reflective surfaces, glass partitions and skylights, the architect provided 87 percent of the required lighting and approximately 38 pecent of the heating from the sun.

The architect's energy concepts cover five basic areas including daylighting, direct solar heat gain, a solar preheater for fresh air, destratification of hot air, and natural ventilation.



Daylighting

Daylighting is achieved by the use of southern glazing and a light shelf with a reflective top surface that bounces light up to the wood ceiling and back down into the work space. The light shelf also contains a strip of indirect fluorescent light for very overcast days. Individual control of task lighting at desk top, and perforated blinds at each work station increases the user's control of the lighting level. The worktop counters have a neutral surface to eliminate glare.



Direct Solar Heat Gain

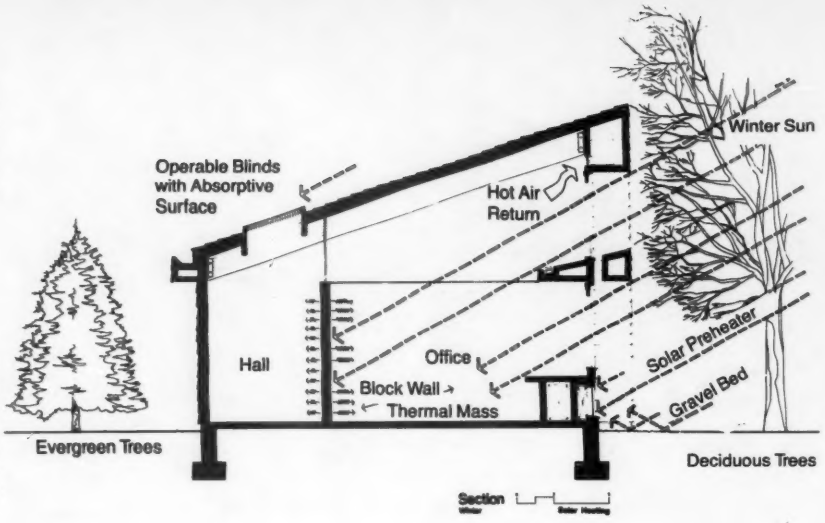
Direct solar heat gain is provided in winter by the sun shining all day on the interior masonry partitions. This stored heat is then released slowly to maintain overnight temperature. The night insulation over windows also helps lessen night heat loss. A quick heatup in the morning is again provided by direct solar gain, as well as computer and employee body heat.

Solar Preheater

A solar preheater runs along the entire southern exposure at the lower windows to preheat the intake of cold fresh air in winter. The preheater also creates positive air pressure within the space to limit air infiltration. In summer this heat is released through small vents at each window.

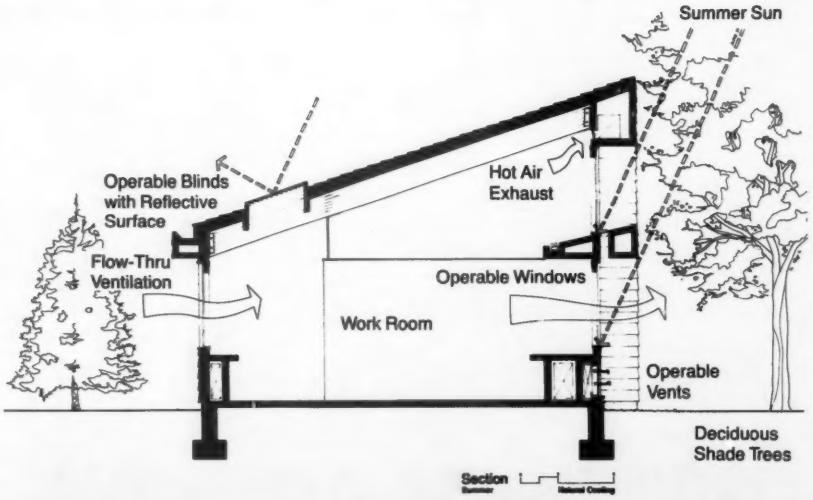
Destratification

Destratification of hot air is achieved by returns located at the highest possible location above the top windows. They correct hot air stratification by returning the hottest air back through the mechanical system. During winter this hot air is recirculated through the duct system to provide space heating, and switches to an outside exhaust system to provide space cooling during summer.



Natural Ventilation

Natural ventilation for summer cooling is provided by openable windows located on both sides of the building in the direction of the prevailing breezes. Mechanical air conditioning is provided for the high humidity of late summer. The combined effect of these energy design features will save the owner an estimated 68 percent of the energy cost that would have been consumed by a conventional office of the same size.



Materials

The structural shell is concrete block covered with 2 inches (5 cm) of exterior insulation board with a nailable outer surface. The exterior is clad with cedar shingles on the walls and cedar shakes on the roof. Inside, laminated wood beams and wood deck form the roof structural system. All partitions are concrete masonry units with wet plaster finish for solar heat storage. The upper part of the partitions is glass to increase daylight distribution. The mechanical back-up heating and cooling system is an electric heat pump.

For further information regarding this facility contact:
Darrell Winslow
Executive Director
Northern Virginia Regional Park Authority
11001 Popes Head Road
Fairfax, VA 22030 USA
or
Lawrence Cook AIA and Associates
3424 Mansfield Road
Falls Church, VA 22041 USA

This article is reprinted from DESIGN, a publication of the US National Park Service, Winter 1984

Photo: US National Park Service

Something For the Very Young

Here is an old idea to make picnicking more enjoyable for toddlers—but for many readers it will be something new and worth copying. These children's seats can be attached permanently to the end of the picnic benches, or can be secured with screws that will permit easy removal.

Photo: Bill Wade, US National Park Service

Interpretation Opportunities

There are innumerable opportunities for interpretation in every natural area, large or small. Although some of these may be repetitious, most visitors do not read each and every notice, and usually are not aware of repeat messages.

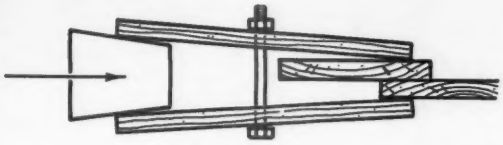
This sign in the Caroni Swamp National Park, Trinidad-Tobago, serves a dual purpose. Placed so that it faces the water, it advises boaters of what they are looking at, and reminds them that several species of wildlife are dependent upon the mangroves for survival.

Similar signs, containing brief but useful information, can be located in areas which sustain heavy visitor use, urging people to protect while they enjoy.

Simple Clamps for Many Applications

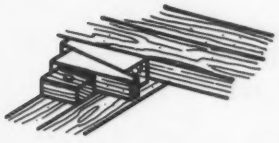
Carpenters and maintenance workers in parks and reserves frequently need tools they don't have. Often these are clamping devices needed to bring and hold parts close together until permanent fastenings can be made, or to exert pressure at some particular point during construction.

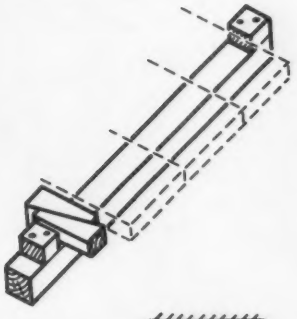
Here are several simple tools based on wedges and levers.



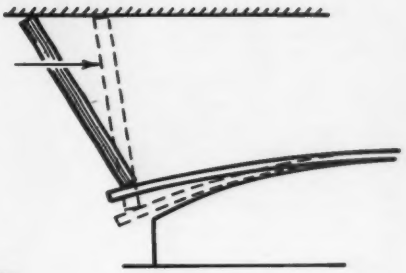
1. Two strong pieces of wood are loosely held together at the center. The center fastening could be a bolt, fibre cords or even rawhide. A wedge driven between the wood pieces at one end tightens the opposite end. The amount of pressure can be increased by moving the point of the center fastening away from the wedged end.

2. Simple wedges can exert great force. Here are several variations, including a pair of wedges driven from opposite directions to equalize the pressure.

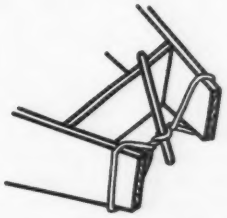




3. A brace started at an angle exerts great pressure when driven straight.



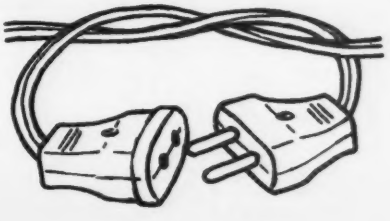
4. A loop, or loops, of rope twisted at the center with a short rod will pull two parts together. This device, often called a Spanish windlass, has a wide range of uses.



Drawings reprinted from Motor Boating & Sailing *magazine, February 1976 © 1976 by the Hearst Corporation, all rights reserved.*

A Firm Temporary Connection

There are occasions when an electric extension wire is not quite long enough to reach the point of use. As a *temporary* expedient, several extension cords or cables can be joined together. The connection illustrated will keep the cords from pulling apart. This idea is reprinted from *Grist* and was originally submitted by the Superintendent of Old Mill State Park in Minnesota, USA.



IUCN Commission on
National Parks and
Protected Areas

CNPPA NOTES

CNPPA Requests Information on World's Most Endangered Protected Areas

Protected areas everywhere are under various forms of stress from people. These are often external to the area itself, such as the effects of upstream air and water pollution, but may also be internal such as from the impact of tourism. In many cases activities are causing substantial alteration to the natural qualities of some areas and serious degradation of essential features will result.

As stated in the Bali Action Plan (Activity 3.4) IUCN is proposing to announce annually a "List of the World's 10 Most Endangered Protected Areas" to highlight the most serious cases. The intent is to create public awareness of the dangers confronting certain areas and in turn to marshal support for retaining or regaining the integrity of the area.

The idea is related to the World Heritage Convention which allows the World Heritage Committee to compile a "World Heritage in Danger List." No World Heritage natural property, however, has yet been placed on such a list. The IUCN List would not be restricted to World Heritage sites nor would it depend on agreement of governments to the listing.

CNPPA is now preparing a reporting system which compiles documentation on protected areas that are under imminent and serious threat. These include threats from military activities, water pollution, dam and pipeline construction, de-gazettement, settlement, abdication of management responsibility, and various other forms of exploitation and deterioration. At the same time CNPPA is assessing what corrective measures and operations are required to relieve the situation.

The Commission, therefore, is requesting suggestions as "nominations" for areas that could be included on this List. Criteria for selection are:

- the threat must be amenable to correction by human action
- only one area from any one country will be selected in any one year (though several may be considered)
- threats must be of a significant nature and seriously affect a major proportion of the area
- sites with existing international recognition (e.g. through Ramsar, MAB, or World Heritage designations) will receive additional scrutiny.

Suggestions for the List should be presented in the following format:

1. Name of endangered site and location
2. Nature of threat
3. Imminence of threat
4. Corrective action needed.

Any documentation in the form of official reports, articles, news accounts, photos, etc., would be appreciated. Sources of information will be treated in confidence, and responsibility for selection will rest with IUCN.

Please send your reaction to the proposal as well as your suggestions to:

Executive Officer
IUCN/CNPPA
Av. du Mont Blanc
1196 Gland, Switzerland

Egypt To Establish Protected Areas

The Arab Republic of Egypt has recently enacted a law to establish protected areas and to create an environmental affairs agency. Dr. Mohamad Kassas (current President of IUCN) will be director of the agency. Ten areas have been tentatively designated for consideration as nature reserves including a national marine park in the Ras Muhammed area of the Sinai Peninsula. The Egyptian Government is to be congratulated for its action in launching this important conservation initiative (source: Sinai Newsletter, Sierra Club International).

New Park in Colombia

IUCN/WWF project leader J. E. Orejuela reports from Colombia that a new national park has been established by INDERENA on Gogona Island in the Pacific Ocean. The Park is reported to have the most extensive and mature coral reef formations in that part of the world. It also has 2,500 ha of lush tropical wet forest. Evacuation of prisoners now on the island is scheduled for mid-1984.

New Principal at Mweka

Bakari Mbano has been appointed the new Principal by the Governing Body of the College of African Wildlife Management in Tanzania. Currently working on a rangeland project in Botswana, Mr. Mbano will take up his duties at Mweka in July of this year.

Mr. Mbano brings with him a strong academic background plus field experience as the assistant director of Tanzania's Wildlife Division. G. T. Mosha will continue as Deputy Principal of the College.

World Heritage List Recognizes 165 Unique Areas

The Convention Concerning the Protection of the World Cultural and Natural Heritage (more commonly known as the World Heritage Convention) was adopted by UNESCO in 1972, and became a reality in 1975 when it was ratified by the 20th country. For the first time it was officially recognized that certain natural and cultural sites have universal value and are worthy of international recognition and respect.

Since that time 165 areas in 43 countries have been inscribed on the World Heritage List. Listed alphabetically by nominating country, they are:

Algeria:
Al Qal'a of Ben Hammad
Tassili n'Ajjer
The M'Zab Valley
Djemila
Tipsasa
Timgad

Argentina:
Los Glaciares

Australia:
Great Barrier Reef
Kakadu National Park
Willandra Lakes Region
Western Tasmania Wilderness National Parks
Lord Howe Island Group

Brazil:
Historic Town of Ouro Preto
Historic Centre of the town of Olinda
Sao Miguel das Missoes

Bulgaria:

Boyana Church
Madara Rider
Rock-hewn Churches of Ivanovo
Thracian Tomb of Kazanlak
Ancient City of Nessebar
Srebarna Reserve
Pirin National Park
Rila Monastary

Canada:

Anthony Island
Burgess Shale Site
Dinosaur Provincial Park
Head-Smashed-In Bison Jump
L'Anse aux Meadows
Nahanni National Park
Wood Buffalo National Park

Costa Rica:

Talamanca Range—La Amistad

Cuba:

Old Havana and its Fortifications

Cyprus:

Paphos

Ecuador:

Galapagos National Park
Historic Center of Quito
Sangay National Park

Ethiopia:

Aksum
Fasil Ghebbi, Gondar Region
Lower Valley of the Awash
Lower Valley of the Omo
Rock-hewn Churches of Lalibela
Simien National Park
Tiya

Egypt:

Abu Mena
Ancient Thebes with its Necropolis
Islamic Cairo
Memphis and its Necropolis—the Pyramid Fields from Giza to Dahshur
Nubian Monuments from Abu Simbel to Philae

Federal Republic of Germany:

Aachen Cathedral
Speyer Cathedral
Wurzburg Residence with the Court Gardens and Residence Square
Pilgrimage Church of Wies

France:

Amiens Cathedral
Chartres Cathedral
Chateau and Estate of Chambord
Cistercian Abbey of Fontenay
Decorated Grottoes of the Vezere Valley
Mont St. Michel and its Bay
Palace and Park of Fontainebleau
Palace and Park of Versailles
Roman and Romanesque Monuments of Arles
The Roman Theatre and its Surroundings and the Triumphal Arch of Orange
The Royal Saltworks of Arc et Senans
Vezelay, Church and Hill
Place Stanislas, Place de la Carriere, and Place d'Alliance, Nancy
Church of Saint-Savin-sur-Gartempe
Classified Site of Cape Girolata and Cape Porto and Scandola Nature Reserve

Ghana:

Ashante Traditional Buildings
Forts and Castles, Volta Greater Accra

Guatemala:

Antigua
Archeological Park and Ruins of Quirigua
Tikal National Park

Haiti:

National History Park—Citadel, Sans Souci Ramiers

Honduras:

Maya Site of Copan
Rio Platano Biosphere Reserve

India:

Ajanta Caves
Ellora Caves
Agra Fort
Taj Mahal

Iran:

Meidan-e Sha, Esfahan
Persepolis
Tchogha Zanbil

Italy:

Church and Dominican Convent of Santa Maria delle Grazie with "The Last Supper" by Leonardo da Vinci
Historic Centre of Florence
Historic Centre of Rome
Rock Drawings in Valcamonia

Ivory Coast:

Tai National Park
Comoe National Park

Libyan Arab Jamahiraya:

Archaeological site of Leptis Magna
Archaeological site of Sabratha
Archaeological site of Cyrene

Malta:

City of Valetta
Ggantija Temples
Hal Salfieni Hypogeum

Morocco:

Medina of Fez

Nepal:

Kathmandu Valley
Sagarmatha National Park

Norway:

Bryggen
Roros
Urnes Stave Church

Pakistan:

Archeological Ruins at Mohenjodaro
Buddhist Ruins at Takht-i-Bahi and Neighboring City Remains at Sahr-i-Bahlol
Fort and Shalimar Gardens at Lahore
Thatta
Taxila

Panama:

Darien National Park
Fortifications on the Caribbean Side of Panama—Portobelo San Lorenzo

Peru:

City of Cuzco
Santuario Historico de Machu Picchu

Poland:

Auschwitz Concentration Camp
Bialowieza National Park
Historic Centre of Cracow
Historic Centre of Warsaw
Wieliczka Salt Mines

Portugal:

Central Zone of the Town of Angra do Heroismo
Monastery of the Hieronymites and the Tower of Belem
Monastery of Batalha
Convent of Christ (Tomar)

Senegal:

Djoudj National Bird Sanctuary
Island of Goree
Niokolo-Koba National Park

Seychelles Republic:

Aldabra Atoll
Vallee de Mai Nature Reserve

Sri Lanka:

Sacred City of Anuradhapura
Ancient City of Polonnaruva
Ancient City of Sigiriya

Switzerland:

Convent of St. Gall
Benedictene Convent of St. John at Mustair
Old City of Berne

Syrian Arab Republic:

Ancient City of Bosra
Ancient City of Damascus
Site of Palmyra

Tanzania:

Ngorongoro Conservation Area
Ruins of Kilwa Kisiwani and Ruins of Songa Mnara
Selous Game Reserve
Serengeti National Park

Tunisia:

Ampitheatre of El Djem
Archeological Site of Carthage
Ichkeul National Park
Medina of Tunis

United States of America:

Cahokia Mounds State Historic Site
Everglades National Park
Grand Canyon National Park
Great Smoky Mountains National Park
Independence Hall
Mammoth Cave National Park
Mesa Verde National Park
Olympic National Park
Redwood National Park
San Juan National Historic Site and La Fortaleza
Yellowstone National Park

Yemen:

The Old Walled City of Shibam

Yugoslavia:

Durmitor National Park
Historical Complex of Split with the Palace of Diocletian
Natural and Cultural-Historical Region of Kotor
Ohrid Region with its Cultural and Historical Aspects and its Natural Environment
Old City of Dubrovnik
Plitvice Lakes National Park
Stari Ras and Sopocani

Zaire:

Garamba National Park
Kahuzi-Biega National Park
Virunga National Park

International

Canada/U.S.:

Kluane National Park-Wrangell/St. Elias National Park

Guinea/Ivory Coast:

Nimba Strict Nature Reserve/Mt. Nimba Strict Nature Reserve
Old City of Jerusalem and Its Walls (Territory in dispute)

BOOKS AND NOTICES

On Interpretation: Sociology for Interpreters of Natural and Cultural History. 1984. Gary E. Machlis and Donald R. Field, eds. Oregon State University Press, Corvallis, Oregon 97331. 192 pages, references and index. Paperback $11.95

This book was prepared on the valid premise that interpretation, as practiced in national parks, and sociology as a science, can be useful partners.

The editors have gathered eleven articles, written by themselves and others, in which various aspects of sociology and interpretation are explored in the effort to establish a foundation for the idea of the partnership. They succeed rather well.

On Interpretation is directed at the experienced audience: senior interpretors, social scientists and administrators who are concerned with the effectiveness of service contacts with the public. Clearly it is a welcome and very useful addition to the literature on the subject.

—R. I. Standish

An Annotated Bibliography of Underwater and Marine Parks Initiatives in Northern Latitudes, 1983. Parks Canada, Marine Studies, National Parks System Div., Hull, Quebec, Canada. 125 pages.

This report, containing more than 500 annotated citations, is a compilation of published materials on marine parks in northern latitudes. The research team of Robert Graham and Don Huff of the University of Waterloo extends some of their current research to produce this compilation of published and unpublished papers, reports, documents and listings. Dr. Jeremy Harrison of IUCN's Protected Areas Data Unit provided the listing of Marine Protected Areas in Northern Areas for this report.

Interviews with protected areas personnel, scientists and public advocacy groups in the United Kingdom, Denmark, Finland, Sweden, Norway and Iceland provided the authors with unique insights and assessments of the literature. Many of the interviewees indicate common requirements for marine and coastal conservation initiatives in northern latitudes, but lamented the unavailability of a format for information exchange between countries. Conservation policies, projects, initiatives, and program evaluations are highlighted. Trends, gaps in knowledge, lack of consistent nomenclature, legal and jurisdictional difficulties, management problems, techniques and impacts are presented in a 16 page review.

— Joe O'Brien

Annual Conference of the Association for Preservation Technology

The annual conference of the Association for Preservation Technology will be held September 19-23, 1984, in Toronto, Canada. The conference theme is Principles in Practice: Philosophical Challenges/Technicological Responses. For details, contact:

Ms. Sheila Larmer, Conference Chair.
c/o Ministry of Citizenship and Culture
77 Bloor St. W, 2nd floor
Toronto, Ontario M7A 2R9, Canada

Regional Protected Areas Seminars

Three regional-based training seminars are being held in 1984. The first is a regional seminar on national parks and wildlife management which will take place in Northern Australia in September and October of this year. The seminar provides a training forum of international standard for middle and upper level wildlife and park management staff from Australia and other countries in the region. Expressions of interest and nominations of delegates from outside Australia should be forwarded as soon as possible to the Director, Australian National Park and Wildlife Service, Box 636. Canberra City, A.C.T. 2601, Australia.

The second regional seminar, sponsored by Helsinki University and the Finland National Board of Forestry, is scheduled for August. This is an 11-day course which looks at protected areas in Finland, Sweden and the U.K. Teaching language is Finnish but participants are also requested to understand Swedish and English. For further information, contact Pekka Borg, Superintendent, Urho Kekhonen National Park, 99690 Vuotso, Finland.

A third regional seminar is being held this October in Argentina. This is also a two-week travelling seminar which visits several parks in the region to review a wide range of management issues being faced. Contact: Director General de Turismo y Recreacion, Avda. Fontana No. 50, 9103 Rawson, Chubut, Argentina.

Finally, a new regional seminar for Eastern Africa co-sponsored by CNPPA and the College of African Wildlife Management is proposed for June 1985. Funds are currently being sought.

The unique features of this water hole in Umfolozi Game Reserve form the basis of a comprehensive management plan prepared by the Conservation Division of the Natal Parks Board. Responsible for the administration of 50 widely diversified parks and reserves, the Board has adopted a coordinated planning approach to assure that the best possible practices are followed. Photo: US National Park Service

Back cover: The water covering the reefs on the Gulf of Agaba side of Ras Muhammed is so clear that only light reflections indicate its presence. The Arab Republic of Egypt is considering establishment of a national marine park in this area of the Sinai Peninsula to protect these unique resources. Photo: D. A. Ferguson, US Fish & Wildlife Service

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